

## 128 Faraday's Researches

of two or three experiments. They may also be almost entirely avoided by selecting that solution which is found to favour them in the least degree (463); and still further by collecting the hydrogen only, and using that as the indicating gas; for being much less soluble than oxygen,, being evolved with twice the rapidity and in larger bubbles (552), it can be collected more perfectly and in greater purity.

457. From the foregoing and many other experiments,, it results that *variation in the size of the electrodes causes no variation in the chemical action of a given quantity of electricity upon water.*

458. The next point in regard to which the principle of constant electro-chemical action was tested,, was *variation of intensity.* In the first place, the preceding experiments were repeated, using batteries of an *equal* number of plates, *strongly* and *weakly* charged; but the results were alike. They were then repeated, using batteries sometimes containing forty, and at other times only five pairs of plates; but the results were still the same. *Variations therefore in the intensity,* caused by difference in the strength of charge, or in the number of alternations used, *produced no difference as to the equal action of large and small electrodes.*

459. Still these results did not prove that variation in the intensity of the current was not accompanied by a corresponding variation in the electro-chemical effects, since the actions at *all* the surfaces might have increased or diminished together. The deficiency in the evidence is, however, completely supplied by the former experiments on different-sized electrodes; for with variation in the size of these, a variation in the intensity must have occurred. The intensity of an electric current traversing conductors alike in their nature, quality, and length, is probably as the quantity of electricity passing through a given sectional area perpendicular to the current, divided by the time (96, *note*'), and therefore when large plates were contrasted with wires separated by an equal length of the same decomposing conductor (449), whilst one current of electricity passed through both arrangements, that electricity must have been in a very different state, as to *tension.*, between the plates and between

the wires; yet the chemical results were the same.  
460. The difference in intensity, under the  
circumstances  
described, may be easily shown practically, by  
arranging two  
decomposing apparatus as in fig. 27, where the  
same fluid is